Purdue University
Faculty Search,
c/o Prof Daniela Bortoletto,
Department of Physics,
525 Northwestern Avenue,
W. Lafayette, IN 47907-2036.

Fermilab, October 9, 2003

Object: Application for Faculty search in Elementary Particle Physics and Astrophysics

Dear Prof Bortoletto,

I'm applying   for the faculty appointment in Elementary Particle Physics and Astrophysics, also
part of a School of Science wide initiative, in the area of Management, Analysis, Visualization, and
Security Aspects of Massive Datasets.
I'm currently a Senior Research Associate at TUFTS University, working for the CDF experiment
at Fermilab.

I started my scientific career as a phenomenologist, working on issues related to fragmentation
phenomena in perturbative QCD. After my graduation at University of Pavia, Italy, in 1995, I
joined the CDF experiment as visiting scientist at Lawrence Berkeley Laboratory, with a fellowship
from Collegio Ghislieri, Pavia. I worked, in the framework of the top analysis, on aspects related to
the systematic uncertainties present in the determination of the top mass.

In 1997 I joined the TUFTS University CDF group and since then I have been involved in several
software projects in 2 HEP experiment: CDF and ATLAS.

In 1997-98 I worked on the proposal for a data handling system based on the use of a OO database
(Objectivity/DB) for CDF. A prototype database system was built to transfer Run I CDF data and
make them accessible via OO visualization/analysis tools. This experience allowed me to get
extensively familiar with C++ and object oriented analysis and design. I kept working on OO
database performances in the framework of the ATLAS offline group and MONARC collaboration.

In 1999 I was appointed leader of the trigger simulation project at CDF. The CDF experiment has a
three level trigger system, two of which (L1/L2) are hardware trigger systems. The trigger
simulation is a set of several C++ software simulation/emulation packages for L1/L2; they are used
as an offline tool to calculate rates and efficiencies and as an online monitoring tool, during data

taking as one of the monitors running in the control room. I personally wrote the complete software for two of the packages (Calorimeter Trigger and Muon Trigger) while I provided the necessary framework - infrastructure, Trigger DB access, etc - for other developers (mainly physicist with no software expertise) to write code specific for their system (track trigger and silicon trigger). I was ultimately responsible for insuring that all the packages would be kept up to date in respect to software development (i.e. software releases), that the executable TRGSim++ would be available to all CDF users on a daily basis, and that of course every change in the hardware would be reflected in the emulation software. The project has been successfully completed in time for the beginning of Run II data taking.

In 2001 I started working on a simple ntuple representation of the CDF event. CDF has indeed adopted ROOT as its data underlying persistency mechanism, but it has hidden the details of it under and intermediate layer (EDM or Event Data Model) accessible via Application Modules of AC++, the OO version of Analysis Control, developed jointly by CDF and BaBar. Our idea was to allow for a quick translation of the data into a flat ROOT Tree, via a standard set of "ntuplizers" for the various objects contained in the CDF event. This would have allowed us to be decoupled from the framework for all the type of analysis not requiring the use of reconstruction modules, while at the same time maintaining a one-to-one correspondence with the event content. eN or evtNtuple is now one of the 3 major analysis tools in CDF and I am the librarian for it.

In the last few years I have demonstrated very good leadership skills as well as the ability to work in a team, while involved in the CDF preparation for Run II. From 1998 to 2000 I served as convener of a subgroup of the Exotic Physics group, aimed at defining triggers and datasets for exotic searches at Run II. In the meantime, I carried out a Run I analysis aimed at searching for the supersymmetric partner of the bottom quark, produced from the decay of gluinos, in collaboration with the Padova/INFN CDF group. Since January 2001 I've been convener of the Exotic Physics group itself, at a time where CDF was setting the stage for run II analysis. At the present time I'm working on an physics analysis using run II data, aimed at the search for exotic particles in models extending the SM of particle physics (Leptoquarks). I had presented my results at the 2003 Rencontres de Moriond on ElectroWeak Interactions and Unified Theories. Subsequent results have been shown at the EPS conference and Lepton-Photon Conference in 2003. During the last few years I have been supervising several Italian summer students at Fermilab, who in general continued working toward obtaining a degree in particle physics. At the present time I'm supervising two TUFTS students toward their thesis projects.

My scientific path has been quite diversified. I was given the opportunity to move relatively smoothly from my theoretical origins to more technical (software) aspects of an experimental reality like CDF. This has given me the possibility of keeping a unified view of high-energy physics since my expertise goes from the theoretical foundations of physics to technical aspects of a HEP experiment. I'm very interested in transmitting this type of vision to the new generations of students, in a time where it is very easy to become extremely specialized in separate aspects of physics. I feel I can contribute well to the ongoing efforts of your Department. I would be interested in continuing working for the CDF experiment, but in the next few years I would move toward a major involvement in the LHC experiments.

                                                        Sincerely,
                                                          Simona Rolli

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P.S.
My current resume is available at:
http://ncdf70.fnal.gov:8001/lifegc.html

The following referees will send letters of reference separately:

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